The principal factors influencing the choice of design criteria for prestressed concrete pressure vessels are discussed, and permissible stresses in concrete, prestressing steel and bonded reinforcement are considered. The behaviour of the vessel during its life under operating conditions and the deformations imposed upon the vessel and penetration liners are discussed, together with the determination of ultimate load factor.

The principal problems encountered in the design and construction of a prestressed concrete pressure vessel system are described, together with the research which has been undertaken in obtaining design solutions. Individual problems are examined, including vessel stresses and deformations, concrete properties, stress concentrations and penetration reinforcement, bonded reinforcement, prestressing components, behaviour and design of the liner and closures, the cooling system and insulation. The behaviour of model vessels at operating and ultimate load conditions is then described.

The manner in which this research and development has been incorporated in the design of the Wylfa reactor vessels is stated.

A description is given of the twin 96 ft. diameter vessels being built at Wylfa, and of the way in which the main reactor plant is accommodated.

The paper concludes with a brief assessment of the possible future development of the prestressed concrete pressure vessel for nuclear power stations.